REMARKS

Claims 1-4, 8-13 and 20 are pending in the application. Claims 1, and 10-11 are currently amended. Claims 14-19 and 21-34 have been previously withdrawn without prejudice. Claims 5-7 have been previously cancelled.

Claim 1 has been amended to recite a spectrometer. The limitation of a spectrometer is present in the original claims 12, 14 and 20. Claims 10-11 have been amended to fix a typographical error. No new matter has been introduced by these amendments.

I. Claim Rejections – 35 U.S.C. §101

Claims 1-4, 8-13 and 20 stand rejected under 35 U.S.C. § 101 as being drawn to non-statutory subject matter. Applicant respectfully disagrees.

The Examiner recognized that the rejected claims are directed to methods, or processes. The Examiner stated that "[f]or a process to be statutory, it must provide: (1) a practical application that must result in a physical transformation (i.e. reduction of an article to a different state or thing), or (2) a practical application that produces a concrete, tangible and useful result." Office Action dated Sept 4, 2008, page 3, citing *State Street Bank & Trust Co. v. Signature Fin. Group*, 149 F.3d 1368 (Fed. Cir. 1998). Applicant respectfully submits that the test set forth in State Street has been overturned by the recent Federal Circuit case *In re Bilski*. *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008).

A claimed process is patent-eligible under §101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing. *Id.* at 954. As the Court in In re Bilski states, the machine-or-transformation test is a two-branched inquiry; an applicant may show that a process claim satisfies § 101 either by showing that his claim is tied to a particular machine, or by showing that his claim transforms an article. *Id.* at 961, citing Benson, 409 U.S. at 70, 93 S.Ct. 253. The Court further cautions that (1) the use of a specific machine or transformation of an article must impose meaningful limits on the claim's scope to impart patent eligibility; and (2) that the involvement of the machine or transformation in the claimed process must not merely be insignificant extra-solution activity. *Id.*, at 961-62, citing Flook, 437 U.S. at 590, 98 S.Ct. 2522.

The instantly rejected claims 1-4, 8-13 and 20, as amended, are directed to methods for predicting the soybean cyst nematode resistance of a soybean sample. The process of claim 1 includes the steps of (a) using a spectrometer to obtain a spectroscopic scan of a soybean sample to provide an assay spectra over a predetermined frequency range; (b) comparing the assay spectra with a predictive model based upon spectra obtained over the predetermined frequency range from individual base samples selected from at least the group consisting of known soybean cyst nematode resistant genotypes, known soybean cyst nematode susceptible genotypes, and known genotypes with varying levels of resistance to soybean cyst nematode; and (c) predicting the soybean cyst nematode resistance of the soybean sample based upon the comparison results between the assay spectra and the predictive model. The claimed process is tied to a machine and the use of the machine, namely, the spectrometer, imposes meaningful limits on the claim's scope.

Moreover, the involvement of the machine in the claimed process is not merely an insignificant extra-solution activity. Indeed, the spectra analysis of the soybean sample using a spectrometer is indispensable for the implementation of the claimed process. Without the use of the spectrometer, no spectra-scan would be available for the comparison step in (b) and thus no prediction can be made in step (c). In conclusion, because the instant claims are tied to a machine which imposes meaningful limits on the scope of the claims, the claims meet the requirement of the utility requirement of 35 USC 101. Withdrawal of the rejections for lack of utility is respectfully requested.

II. Claim Rejections – 35 U.S.C. §103

Claims 1-4, 8, 10-13, and 20 stand rejected under 35 U.S.C. §103(a) as being obvious over Qiu et al. (Journal of Nematology, 1997, Vol. 29, 523-30) ("Qiu" hereinafter), in view of Marek et al. (Crop Sci., 2000, vol. 40, p713-16) ("Marek" hereinafter) and Rutherford (Journal of Chemical Ecology, 1998, Vol. 24, p1447-63) ("Rutherford" hereinafter). Applicant respectfully disagrees.

Obviousness is a question of law based on underlying factual inquiries. The factual inquiries (also known as the "Graham factual inquiries") to be performed by the Examiner are as follows:

(1) Determining the scope and content of the prior art;

(2) Ascertaining the differences between the claimed invention and the prior art; and

(3) Resolving the level of ordinary skill in the pertinent art.

Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in KSR International Co. v. Teleflex Inc., Federal Register, Vol. 72, No. 195, 57526-35, 57526 (October 10, 2007)("Examination Guidelines" hereinafter). Once the Graham factual inquiries are resolved, the Examiner must determine whether the claimed invention would have been obvious to one of ordinary skill in the art. Prior art is not limited just to the references being applied, but includes the understanding of one of ordinary skill in the art. Although the prior art reference (or references when combined) need not teach or suggest all the claim limitations, the Examiner must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art. *Id.* 57528.

As explained in the Response to Office Action filed May 6, 2008, at least two major differences exist between Applicant's claimed invention and the disclosure of the cited references. First, the instant claims recite methods of scanning soybean seeds (samples) using a spectrometer to predict whether or not soybean plants to be grown from these soybean seeds will be resistant to soybean cyst nematode using a predictive model. By contrast, the cited references combined do not teach or suggest that spectra scan of soybean samples can be used to predict the susceptibility of the soybean plant that is originated from the soybean sample. Qiu never teaches that resistant and susceptible soybean strains exhibit different levels of chitinase before infection or infestation. *See* Fig. 1A on page 526 of Qiu, showing that the chitinase activities remain the same when no *Meloidogyne* is used to infect the resistant cultivar and susceptible cultivar. Qiu further discloses that resistant cultivar and susceptible cultivar only begin to show differences in chitinase activity 3 days after infestation. Marek merely discloses that chitinase activity can be measured by NIR spectroscopy. Rutherford relates to a method for predicting sugarcane resistance to certain stalk borer. Taken together, neither Qiu, nor Marek, nor Rutherford teaches or suggests that chitinase activity in an uninfected

soybean sample can be used to predict the relative SCN susceptibility of a soybean plant derived from the soybean sample because none of the references teach or suggest that uninfected soybean samples from resistant cultivar and susceptible cultivar exhibit any differences in chitinase activity.

Having read Qiu, Marek and Rutherford, one of ordinary skill in the art would reasonably conclude that inoculation of a soybean with SCN is necessary in order to assess the susceptibility of a soybean strain. Thus, one of ordinary skill would not know that NIR scan of a soybean samples can be used to predict nematode susceptibility. This is so because the term "predict" means to foretell, or to declare in advance. To inoculate a soybean plant with a nematode in order to tell whether the plant is resistant or susceptible to said nematode does not constitute prediction.

Secondly, all rejected claims include the limitation of soybean cyst nematode, or SCN. The root-knot nematode (*Meloidogyne incognita*) disclosed in Qiu and the SCN (*Heterodera glycines Inchinohe*) of the present claims belong to different genera of nematodes and may have different modes of infection on different hosts. *See, e.g.* paragraph 7 of the original specification. Just because a soybean plant is resistant to one species of nematode does not necessarily mean that it is also resistant to another nematode species. There is no indication that Marek or Rutherford teaches otherwise. Thus, even if we assume that the cited references disclose a method for predicting soybean susceptibility to root-knot nematode, it does not follow that the cited references also render obvious other methods to predict soybean susceptibility to SCN. Applicant does not understand why the Examiner believes that the claimed invention would be obvious even though none of the references teach or suggest any means to predict soybean susceptibility to SCN.

In fact, even the cited reference itself admits that no correlation between disease resistance and chitinase activity can be positively established. See e.g., Page 528, left col., lines 25-29 of Qiu stating that one may "speculate that the higher chitinase activity detected in the resistant cultivar Bryan could be associated with root-knot nematode resistance in soybean." (emphasis added). Recognizing the shortcomings that its studies are far from conclusive because of the small sample size and the use of non-isogenic strains, Qiu states that further studies "utilizing better-defined genetic material such as

near isogenic lines or recombinant inbred lines are required." Page 528, left col., line 29 to Page 528, right col., line 3 of Qiu. Taken together, none of the three cited references teach that chitinase activity in a soybean sample can predict the relative susceptibility of a soybean plant to SCN.

Thus, because substantial differences exist between Applicant's claimed invention and the cited references, and because the Examiner has not advanced a reasonable rationale to support the legal conclusion that the claimed inventions are obvious over the cited art, withdrawal of the rejections is respectfully requested.

Claims 1, 8 and 9 stand rejected under 35 U.S.C. §103(a) as being obvious over Rutherford, in view of Qiu and Marek, and further in view of Borggaard et al. (Anal. Chem. 1992, 64:545-51) ("Borggaard"). Applicant disagrees with Examiner for reasons discussed above with regard to Rutherford, Qiu and Marek, as well as reasons presented in the following text with respect to the references combined.

As discussed above, there is no teaching in Qiu, Rutherford, and Marek that near infrared (NIR) spectroscopic data can be used to predict soybean resistance to SCN. Nor do these references disclose the limitation wherein the assay spectra obtained from a soybean sample are compared with a predictive model based on spectra data obtained from soybean varieties with known resistance or susceptibility to SCN to predict the SCN resistance or susceptibility of the soybean sample based upon the comparison results. The addition of Borggaard does not cure this deficiency because Borggaard does not teach comparing NIR spectra with a predictive model to predict SCN resistance or susceptibility. Withdrawal of the obviousness rejections is respectfully requested.

For the foregoing reasons, Applicant's attorney respectfully solicits a Notice of Allowance. The fee for a 2-month extension of time is submitted herewith. Applicant believes no additional fees are due at this time. However, if any fees are deemed necessary in connection with this filing, the Commissioner is hereby authorized to charge deposit account No. 12-0600.

Respectfully submitted,

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